Setup

- Calibrate Accelerometer
- Calibrate Magnetometer
- Reset Settings
- Backup
- Restore

Place board or frame on **leveled** surface, proceed with calibration, ensure platform is not moving during calibration period.

Move multirotor at least **360** degrees on all axis of rotation, you have 30 seconds to perform this task.

Restore settings to **default**

**Backup** your configuration in case of an accident, **CLI** settings are not included - See 'dump' cli command

**Info**
- Battery voltage: 0 V
- Capacity drawn: 0 mAh
- Current draw: 0.00 A
- RSSI: 0 %

**GPS**
- 3D Fix: 
- Sats: 
- Latitude: 
- Longitude: 

**Instruments**

**Heading:** 221 deg
**Pitch:** 1.8 deg
**Roll:** 0.5 deg

Reset Z axis, offset: 0 deg
### Ports

**Note:** not all combinations are valid. When the flight controller firmware detects this the serial port configuration will be reset.

**Note:** **Do NOT** disable MSP on the first serial port unless you know what you are doing. You may have to reflash and erase your configuration if you do.

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Data</th>
<th>Logging</th>
<th>Telemetry</th>
<th>RX</th>
<th>GPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>UART1</td>
<td>MSP</td>
<td>Blackbox</td>
<td>Disabled</td>
<td>Serial RX</td>
<td>57600</td>
</tr>
<tr>
<td>UART2</td>
<td>MSP</td>
<td>Blackbox</td>
<td>Disabled</td>
<td>Serial RX</td>
<td>57600</td>
</tr>
</tbody>
</table>
Note: Not all combinations of features are valid. When the flight controller firmware detects invalid feature combinations conflicting features will be disabled.
Note: Configure serial ports before enabling the features that will use the ports.

**Mixer**

- Quad X

**ESC/Motor Features**

- **MOTOR_STOP**: Don't spin the motors when armed
- **ONESHOT125**: ONESHOT ESC support
- **Disarm motors regardless of throttle value (When arming via AUX channel)**
- **5**: Disarm motors after set delay (Seconds) (Requires MOTOR_STOP feature)
- **1100**: Minimum Throttle
- **1500**: Minimum Throttle [RT inputs center value]
- **2000**: Maximum Throttle
- **1000**: Minimum Command

**Board and Sensor Alignment**

- **Roll Degrees**
- **Pitch Degrees**
- **Yaw Degrees**

**Accelerometer Trim**

- **Accelerometer Roll Trim**
- **Accelerometer Pitch Trim**

**Receiver Mode**

- **RX_PPM**: PPM RX input
- **RX_SERIAL**: Serial-based receiver (SPEKSAT, SBUS, SUMD)
- **RX_PARALLEL_PWM**: PWM RX input (one wire per channel)
- **RX_MSP**: MSP RX input (control via MSP port)

**Battery Voltage**

- **VBAT**: Battery voltage monitoring
- **Minimum Cell Voltage**
- **Maximum Cell Voltage**
- **Warning Cell Voltage**

**Save and Reboot**
Serial Receiver Provider

- Note: Remember to configure a Serial Port (via Ports tab) and choose a Serial Receiver Provider when using RX_SERIAL feature.

SPEKTRUM1024
SPEKTRUM2048
SBUS
SUMD
SUMH
XBUS_MODE_B
XBUS_MODE_B_RJ01

Current Sensor

- CURRENT_METER: Battery current monitoring
- Scale the output voltage to millamps [1/10th mV/A]
- Offset in millivolt steps
- Battery Current
- Enable support for legacy Multiwii MSP current output

System configuration

- Note: Changing this may require PID re-tuning.
- Flight Controller Loop Time
- Cycles/Sec (Hz)

GPS

- Note: Remember to configure a Serial Port (via Ports tab) when using GPS feature.

GPS: GPS for navigation and telemetry
NMEA: Protocol
Auto-detect: Ground Assistance Type
Magnetometer Declination [deg]

Other Features

- INFLIGHT_ACC_CAL: In-flight level calibration
- SERVO_TILT: Servo gimbal
- SOFTSERIAL: Enable CPU based serial ports
- SONAR: Sonar
- TELEMERTY: Telemetry output
- 3D: 3D mode (for use with reversible ESCs)
- LED_STRIP: Multi-color RGB LED strip support
- DISPLAY: OLED Screen Display
### RSSI (Signal Strength)
- RSSI_ADC: Analog RSSI input

### System Configuration
**Note:** Changing this may require PID re-tuning.
- Flight Controller Loop Time: 2000
- Cycles/Sec (Hz): 500

### GPS
- **Note:** Remember to configure a Serial Port (via Ports tab) when using GPS feature.
- GPS: GPS for navigation and telemetry
- Protocol: NMEA
- Ground Assistance Type: Auto-detect
- Magnetometer Declination [deg]: 0

### Other Features
- INFLIGHT_ACC_CAL: In-flight level calibration
- SERVO_TILT: Servo gimbal
- SOFTSERIAL: Enable CPU based serial ports
- SONAR: Sonar
- TELEMETRY: Telemetry output
- 3D: 3D mode (for use with reversible ESCs)
- LED_STRIP: Multi-color RGB LED strip support
- DISPLAY: OLED Screen Display
- BLACKBOX: Blackbox flight data recorder
- CHANNEL_FORWARDING: Forward aux channels to servo outputs

### 3D
- 3D Deadband Low: 1406
- 3D Deadband High: 1514
- 3D Neutral: 1460
- 3D Deadband Throttle: 50
Failsafe configuration has changed considerably. Use Cleanflight v1.12.0+ to enable the improved configuration panel.

### Receiver failsafe

- **Failsafe settings on RX signal loss**
- **1000** Failsafe Throttle
## PID Tuning

### PID Controller
- **MultiWii (Rewrite)**

### Basic/Acro
<table>
<thead>
<tr>
<th>Name</th>
<th>Proportional</th>
<th>Integral</th>
<th>Derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROLL</td>
<td>6.2</td>
<td>0.035</td>
<td>47</td>
</tr>
<tr>
<td>PITCH</td>
<td>7.2</td>
<td>0.040</td>
<td>42</td>
</tr>
<tr>
<td>YAW</td>
<td>10.0</td>
<td>0.045</td>
<td>3</td>
</tr>
</tbody>
</table>

### Magnometer/Heading
- **MAG**: 4.0

### Angle/Horizon
<table>
<thead>
<tr>
<th>Strength (Angle)</th>
<th>Strength (Horizon)</th>
<th>Transition (Horizon)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL</td>
<td>2.0</td>
<td>0.010</td>
</tr>
</tbody>
</table>

### ROLL rate
- 0.75

### PITCH rate
- 0.75

### YAW rate
- 1.00

### TPA
- 0.00

### TPA Breakpoint
- 1500
Please read receiver chapter of the documentation. Configure serial port (if required), receiver mode (serial/ppm/pwm), provider (for serial receivers), bind receiver, set channel map, configure channel endpoints/range on TX so that all channels go from -1000 to 2000. Set midpoint (default 1500), trim channels to 1500, configure stick deadband, verify behaviour when TX is off or out of range.

**IMPORTANT:** Before flying read failsafe chapter of documentation and configure failsafe.

<table>
<thead>
<tr>
<th>Channel Map</th>
<th>RSSI Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAER1234</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

- **Roll:** 1500
- **Pitch:** 1500
- **Yaw:** 1500
- **Throttle:** 885

| AUX 1   | 1500 |
| AUX 2   | 1500 |
| AUX 3   | 1500 |
| AUX 4   | 1500 |

<table>
<thead>
<tr>
<th>Throttle MID</th>
<th>Throttle EXPO</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RC Rate</th>
<th>RC Expo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.10</td>
<td>0.70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RC Yaw Expo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
</tr>
</tbody>
</table>

**Graphs:**
- X-axis: 0 to 2000
- Y-axis: 0 to 2200

**Other controls:**
- **50 ms**

---

**Buttons:**
- **Refresh**
- **Save**
Use ranges to define the switches on your transmitter and corresponding mode assignments. A receiver channel that gives a reading between a range min/max will activate the mode. Remember to save your settings using the Save button.
Figure adjustment switches. See the 'in-flight adjustments' section of the manual for details. The changes that adjustment functions make are not saved automatically. There are 4 slots. Each switch used to concurrently make adjustments requires exclusive use of a slot.

Examples:
- Slot 1 and a 3POS switch on AUX1 to select between Pitch/Roll P, I and D and another 3POS switch on AUX2 to increase or decrease the value when held up or down.
- Slot 2 and a 3POS switch on AUX4 to select enable Rate Profile Selection via the same 3POS switch on the same channel.

<table>
<thead>
<tr>
<th>Enabled</th>
<th>when channel</th>
<th>is in range</th>
<th>then apply</th>
<th>using slot</th>
<th>via channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUX 1</td>
<td>Min: 900</td>
<td>Max: 950</td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td></td>
<td>900 1000 1200 1400 1500 1600 1800 2000 2100</td>
<td></td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td>AUX 1</td>
<td>Min: 900</td>
<td>Max: 950</td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td></td>
<td>900 1000 1200 1400 1500 1600 1800 2000 2100</td>
<td></td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td>AUX 1</td>
<td>Min: 900</td>
<td>Max: 950</td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td></td>
<td>900 1000 1200 1400 1500 1600 1800 2000 2100</td>
<td></td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td>AUX 1</td>
<td>Min: 900</td>
<td>Max: 950</td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td></td>
<td>900 1000 1200 1400 1500 1600 1800 2000 2100</td>
<td></td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td>AUX 1</td>
<td>Min: 900</td>
<td>Max: 950</td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td></td>
<td>900 1000 1200 1400 1500 1600 1800 2000 2100</td>
<td></td>
<td>No changes</td>
<td>Slot 1</td>
<td>AUX 1</td>
</tr>
<tr>
<td>Name</td>
<td>MID</td>
<td>MIN</td>
<td>MAX</td>
<td>Angle at min</td>
<td>Angle at max</td>
</tr>
<tr>
<td>--------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Servo 0</td>
<td>1500</td>
<td>1000</td>
<td>2000</td>
<td>-90</td>
<td>90</td>
</tr>
<tr>
<td>Servo 1</td>
<td>1500</td>
<td>1000</td>
<td>2000</td>
<td>-90</td>
<td>90</td>
</tr>
<tr>
<td>Servo 2</td>
<td>1500</td>
<td>1000</td>
<td>2000</td>
<td>-90</td>
<td>90</td>
</tr>
<tr>
<td>Servo 3</td>
<td>1500</td>
<td>1000</td>
<td>2000</td>
<td>-90</td>
<td>90</td>
</tr>
<tr>
<td>Servo 4</td>
<td>1500</td>
<td>1000</td>
<td>2000</td>
<td>-90</td>
<td>90</td>
</tr>
<tr>
<td>Servo 5</td>
<td>1500</td>
<td>1000</td>
<td>2000</td>
<td>-90</td>
<td>90</td>
</tr>
<tr>
<td>Servo 6</td>
<td>1500</td>
<td>1000</td>
<td>2000</td>
<td>-90</td>
<td>90</td>
</tr>
<tr>
<td>Servo 7</td>
<td>1500</td>
<td>1000</td>
<td>2000</td>
<td>-90</td>
<td>90</td>
</tr>
</tbody>
</table>
### GPS

<table>
<thead>
<tr>
<th>GPS</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D Fix</td>
<td>False</td>
</tr>
<tr>
<td>Altitude</td>
<td>0 m</td>
</tr>
<tr>
<td>Latitude</td>
<td>0.0000 deg</td>
</tr>
<tr>
<td>Longitude</td>
<td>0.0000 deg</td>
</tr>
<tr>
<td>Speed</td>
<td>0 cm/s</td>
</tr>
<tr>
<td>Sats</td>
<td>0</td>
</tr>
<tr>
<td>Dist to Home</td>
<td>0 m</td>
</tr>
</tbody>
</table>

### GPS Signal Strength

<table>
<thead>
<tr>
<th>Set ID</th>
<th>Qty</th>
<th>Signal Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
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<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

### Current GPS location

Waiting for GPS 3D fix...
Your flight controller’s firmware does not support transponder functionality.

Transponder systems allow race organizers to time your laps. The transponder is fitted to your aircraft and when your aircraft passes the timing gate the track-side receiver registers your code and records your lap time. When fitting an IR based transponder you should ensure that it points outward from your aircraft towards the track-side receivers and that the light beam is not obstructed by your airframe, battery-straps, cables, propellers, etc.
LED Strip

The flight controller can control colors and effects of individual LEDs on a strip. Configure LEDs on the grid, configure wiring order then attach LEDs on your aircraft according to grid positions.

LED Functions

- Warnings
- Modes & Orientation
- Indicator
- Arm State
- Throttle
- Ring
- Color

LED Orientation and Color

LED Strip Wiring

Wire Ordering Mode

Clear selected  Clear ALL Wiring

LEDs without wire ordering number will not be saved.
Keep in mind that using fast update periods and rendering multiple graphs at the same time is resource heavy and will burn your battery quicker if you use a laptop. We recommend to only render graphs for sensors you are interested in while using reasonable update periods.

- **Gyroscope** - deg/s
  - Refresh: 50 ms
  - Scale: 2000
  - X: -1.22
  - Y: -0.98
  - Z: 0.24

- **Accelerometer** - g
  - Refresh: 50 ms
  - Scale: 2
  - X: -0.04
  - Y: 0.01
  - Z: 1.00

- **Magnetometer** - Ga
  - Refresh: 50 ms
  - Scale: 1
  - X: -0.30
  - Y: -0.27
  - Z: -0.12
Tethered Logging

Data will be logged in this tab **only**, leaving the tab will **cancel** logging and application will return to its normal "configurator" state.

You are free to select the global update period, data will be written into the log file every **1 second** for performance reasons.

- **MSP_RAW_IMU** 9 columns (accel[x, y, z], gyro[x, y, z], mag[x, y, z])
- **MSP_ATTITUDE** 3 columns (x, y, z)
- **MSP_ALTITUDE** one column
- **MSP_RAW_GPS** 7 columns
- **MSP_ANALOG** 4 columns
- **MSP_RC** 8 columns by default
- **MSP_MOTOR** 8 columns by default
- **MSP_DEBUG** 4 columns

**100 ms**

**Samples Saved:** 0

**Log Size:** 0 Bytes
## Dashboard serial logging device

You can log to an external logging device (such as an OpenLog or compatible clone) by using a serial port. Configure the port on the Ports tab.

## Dashboard dataflash chip

Data logs can be recorded to your flight controller’s onboard dataflash chip.

- [Erase flash](#)
- [Save flash to file...](#)

If your flight controller does not have a compatible dataflash chip available.